Air Quality Report

United States
Department of
Agriculture

Forest Service

Pine Mountain LSR Enhancement and Protection Project

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Upper Lake Ranger District, Mendocino National Forest, Lake County CA

Prepared By: Hinda Darner_
Fuels Officer

Introduction

This is an analysis of the current condition of and potential impacts to air resources in the area of the proposed project that may result from the described alternatives. The smoke from combustion contains a number of pollutants, including microscopic particles referred to as "particulate matter" (PM). Exposure to particulate matter can cause significant health problems, especially for people suffering from respiratory illnesses. Smoke can also have an adverse effect on air quality and visibility. The Environmental Protection Agency (EPA) have set standards that air quality regulators and land managers must take into consideration, in order to minimize smoke impacts. This report describes the existing air quality conditions and the potential effects of treatments under the

Purpose and Need for the Project

See Fire and Fuels Report

Methodology of Analysis

Assumptions and Limitations

- Burning activities would take multiple entries to meet objectives
- Mechanical treatments would be conducted over a period of 5-15 years
- For modeling purposes the primary species burned was Douglas Fir. Piles were burned under winter conditions. Understory burns were burned under Fall and Spring conditions (50% of the area under fall and 50% of the area under spring). This was the best guess of amounts of areas being burned under different weather conditions in order to meet goals and objectives of the project.

Modeling Programs Used

- FOFEM – The First Order Fire Effects Model was used to estimate emmissions that could be produced from burning activities. FOFEM is a computer program that was developed to predict the direct consequences of prescribed fire and wildfire. FOFEM's modeling emissions were taken from Hardy and others (1996) and emission production depends on fuel consumption and the combustion efficiency of the fire. The model does not predict visibility or dispersion. Emissions production depends both on fuel consumption and on the combustion efficiency of the fire. FOFEM assumes the entire area of concern experienced fire and does not predict fire effects accurately for mosaic or non-uniform burns.

Overview of Issues Addressed

There is a concern about the possible effects on human health from smoke as a result of prescribed burning. There is also concern the proposed project will negatively affect air quality and visibility in the surrounding communities and nearby wilderness areas.

Affected Environment

Existing Conditions

California is divided geographically into air basins for the purpose of managing air resources on a regional basis. An air basin generally has similar meteorological and geographic conditionsthroughout;California is divided into fifteen air basins (figure 1).

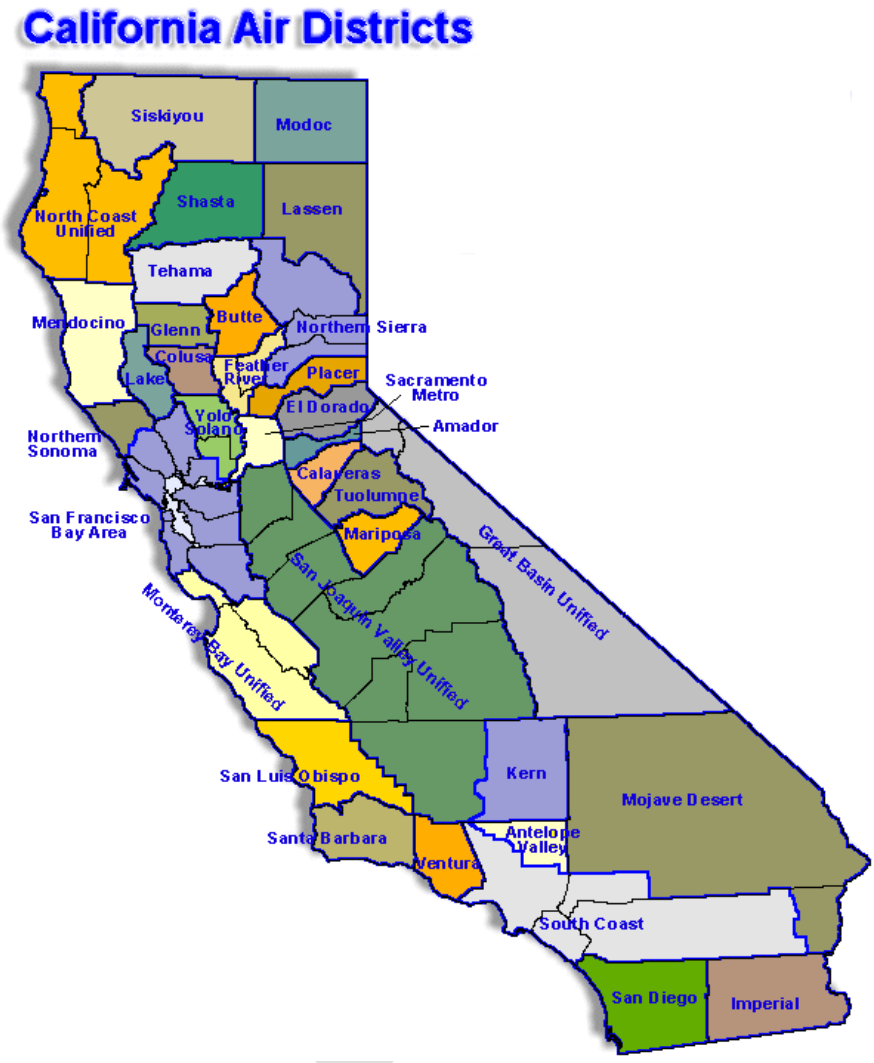
Figure 1. California air basins.

The State is divided into Air Pollution Control Districts (APCD) and Air Quality Management Districts (AQMD), which are also called air districts. These agencies are county or regional governing authorities that have primary responsibility for controlling air pollution from stationary sources. The following map (Figure 2) shows the Air District Boundaries.

The majority of the project area falls within the Lake County Air Basin and is managed by the Lake County Air Quality Management District (LCAQMD). Approximately 70 acres of the project falls within the Mendocino County Air Quality Management District (MCAQMD). The proposed Pine Mountain project area lies mostly within the Lake County Air Basin with 70 acres in the North Coast Air Basin. The nearest Class I Airshed is approximately 30 miles to the North in the Yolla Bolly Wilderness. The elevation of the project area ranges from 1,548feet to 3,971

feet and is approximately 15 miles North of the community of Upper Lake, approximately 5 miles East of the communities in and around Potter Valley and 4 miles South of the communities around Lake Pillsbury.

Figure 2 – California Air Districts



Desired Condition

Forest Plan Direction:

- ***Goal: Manage National Forest activities to maintain air quality at a level which meets or exceeds State and/or local government regulations.***
- ***Standards and Guide:***

1. Manage National Forest activities to maintain air quality at a level which meets or exceeds State and/or local government regulations.

2. Conduct prescribed fire activity only on burn days unless variances are obtained from appropriate Air Pollution Control Boards.

3. Require proper dust abatement measures to be taken pnor to any actlvii that will result in the sustained generation of dust.

4. Coordinate prescribed burning activities with affected groups and agencies.

5. Conduct prescribed burning outside Of the Yolla Bolly-Middle Eel Wilderness so that Air Quality Resource Values (AQRVs) within the Wilderness are not adversely affected. Adverse impact assessments will be conducted following the recommendations contained in the document titled 'Guidelines for Evaluating Air Pollution Impacts on Class One Wilderness areas in California.'

Regulatory Framework

Air quality is managed through a complex series of Federal, State, and local laws and regulations designed to assure compliance with the Clean Air Act. The Pine Mountain Project is designed to meet the goals, objectives and standards set forth by the following Federal and local regulatory framework. The Environmental Protection Agency (EPA) has the primary federal role of ensuing compliance with the requirements of the Clean Air Act. The EPA issues national air quality regulations, approves and oversees State implementation plans, and conducts enforcement actions. The EPA established National Ambient Air Quality Standards (NAAQS) to protect human health and welfare and established primary and secondary NAAQS for pollutants such as the PM10 and PM2.5,Carbon Monoxide (CO), Nitrogen Oxides (NO_x) and Volatile Organic Carbons (VOCs), which are considered unhealthy for the public. In addition, greenhouse gases like Carbon Dioxide (CO_2) and Methane (CH_4) are also emitted. Air quality rules and regulations for the EPA and the standards for these pollutants can be found at http://www.epa.gov/.An air quality standard defines the maximum amount of a pollutant that can be present in outdoor air without harm to the public's health.

Federal Clean Air Act

In 1963, Congress passed the Federal Clean Air Act and amended the act in 1970, 1977, and 1990. The purpose of the act is to protect and enhance air quality while ensuring the protection of public health and welfare. The 1970 amendments established National Ambient Air Quality Standards, which must be met by most state and Federal agencies, including the Forest Service.

States are given the primary responsibility for air quality management. Section 110 of the Clean Air Act requires states to develop state implementation plans that identify how the State will attain and maintain NAAQS. The Clean Air Act also allows states, and some counties, to adopt unique permitting procedures and to apply more stringent standards. California has set standards for certain pollutants, such as particulate matter and ozone, which are more protective of public health than respective Federal standards. California has also set standards for some pollutants that are not addressed by Federal standards (CARB 2013a).

The Clean Air Act requires that Forest Service actions have "no adverse effect" on air resources by meeting the NAAQS and non-degradation standards for class 1 areas. Managers are further directed to improve existing substandard conditions and reverse negative trends where practicable. All prescribed fire burn plans would address mitigation measures to minimize smoke impacts and comply with the Clean Air Act. The NAAQS and CAAQS for particle pollution as set by the Clean Air Act and California Air Resources Board can be viewed online at the California Air Resources Board webpage.[1]

State Regulations

California law authorizes the California Air Resources Board (CARB) to set ambient (outdoor) air pollution standards (California Health & Safety Code section 39606) in consideration of public health, safety, and welfare.

The CARB is responsible for meeting the Clean Air Act requirements. The CARB has further delegated the authority to local Air Pollution Control Districts (APCDs) or Air Quality Management Districts (AQMDs) for stationary sources, while retaining the authority for mobile sources. Air quality rules and regulations for California can be found at http://www.arb.ca.gov/homepage.htm. The APCD/AQMD has the primary responsibility for meeting the requirements of the Clean Air Act. This responsibility is carried out through the development and execution of state implementation plans, which must provide for the attainment and maintenance of air quality standards. The Forest Service is required to comply with all requirements of the California State Implementation Plan.

The Air Pollution Control or Air Quality Management Districts have the primary responsibility for meeting the requirements of the Clean Air Act. The Pine Mountain Project would be administered by the Upper Lake Ranger District of the Mendocino National Forest. This responsibility is carried out through the development and execution of implementation plans, which must provide for the attainment and maintenance of air quality standards. Air quality rules and regulations for Lake County Air Quality Management District can be found at their web site at http://www.lcaqmd.net/ and for Mendocino County Air Quality Management District at http://www.co.mendocino.ca.us/aqmd/index.html.

Alternative 1

Direct Effects

There would be no direct effects to air quality from the no-action alternative because no treatments would occur.

Indirect Effect

Under this alternative, no treatments would occur and there would be no emissions contributing to air quality degradation. This alternative could lead to increased accumulation of ground fuel due to insect and

[1] http://www.arb.ca.gov/research/aaqs/aaqs2.pdf

disease activity and natural forest succession. The accumulation of ladder and ground fuels may lead to an increased probability of high intensity wildfire in the future, which could result in air quality degradation. Research indicates wildfires can produce nearly twice the amount of smoke as prescribed fire (Huff et al. 1995). Air quality can be degraded by smoke from wildfires to the point of human illness in some instances. Hardy (2001) noted emissions from wildfire are typically greater than emissions from a prescribed fire on the same acreage due to greater emission factor, fuel consumption, and fire intensity. Wildfires are also known to result in high levels of emissions. Smoke from wildfire can cause visual impacts to the surrounding area and create hazardous driving conditions on adjacent state, county, and Forest Service roads for extended periods of time. In the short-term air quality impacts from alternative 1 would be less because prescribed burning and pile burning would not occur. If a wildfire were to occur, the potential indirect effects include degraded air quality and reduced visibility. Consumption of the increased fuel loads and understory biomass would increase the amount of smoke emissions. These emissions would also occur over a period of a few days to several weeks as opposed to intermittent days over several years for a prescribed fire project.

Cumulative Effects

Cumulative effects of smoke are unknown because the intensity and size of a potential wildfire is unknown.

Alternative 2, 3, 4 and 5

Direct and Indirect Effects

Prescribed fire operation generally release significantly less pollutants than an uncontrolled wildfire would under the no-action alternative. Emissions from a prescribed burncan be managed better than emissions from a wildfire and mitigation measures are used during prescribed burning operations to reduce emissions impacts. Smoke may settle in drainages during the evening hours following ignition. It is expected treatments would decrease fire intensity, severity and emissions should a wildfire occur in the project area after treatment. All burning activities would be in accordance with Federal, State, and local guidelines as administered by the Lake County Air Quality Management District and the Mendocino County Air Quality Management District. No significant impacts to any class 1 Areas or sensitive receptor are expected. The amount of emissions released would not change significantly during prescribed burning operations when comparing alternatives 2,3,4 and 5. However, alternative 2 would have a greater impact on reducing the amount of emissions expected if a wildfire were to occur after treatment.

After implementation of treatments, subsequent wildfires in the project area would produce significantly less pollution than they would in the no-action alternative. See table 1 for emissions modeling summary.

Table 1 – Emissions Comparison

Tree Vegetation Type

Fire Type	**PM_{10} (pounds/acre)**	**$PM_{2.5}$ (pounds/acre)**	**CO_2 (pounds/acre)**
Wildfire (Summer) Before Treatment/Alternative1	4467	3786	255526
Wildfire (Summer) After Treatment/Alternative2	2589	2195	148475
Prescribed Fire (Fall) 1st Entry	2340	1983	125841
Prescribed Fire (Fall) Further Entry	1051	890	57243
Prescribed Fire (Spring) 1st Entry	1903	1613	101219
Prescribed Fire (Spring) Further Entry	807	684	44100
Pile Burning (Fall)	2732	2315	199130
Pile Burning (Spring)	2185	1852	158315

Cumulative Effects

Cumulative effects on air quality as a result of the implementation of alternative 2 would have the greatest decrease in air quality pollutants being released from a wildfire. Emitted pollutants from fire have an effect on an area depending on atmospheric conditions at the time of the fire. Pollutants from fires can be cumulative with emissions from many local and regional sources, including other fires, vehicles, industrial sources, and agriculture. Because of the widespread and short-lived impacts of emissions from fire, no other projects were explicitly considered for cumulative impact analysis. It is impossible to predict what pollution sources may be present at the time of a fire occurring at an unspecified date in the future.

The Lake and Mendocino County Air Quality Management Districts regulate permissible burn days for prescribed fire use within their respective districts and because of the regulations in place, emissions generated from implementation of the project are not expected to exceed Federal and State air quality standards. The improved wildfire suppression characteristics created by combined thinning and fuel treatment activities should lead to a reduction in size and intensity of wildfires in the treated areas. In the long term, the emissions from wildfires are expected to be reduced as a result of reduced fuel loading.

Mitigation and Design Features

Burning would be accomplished under Federal, State, and local guidelines as administered by the Lake and Mendocino County Air Quality Management Districts. All burn projects follow the

District's requirements for approval previous to burn implementation and follow up burn reporting.

Compliance with Forest Plan and Other Regulatory Direction

All prescribed burning would be implemented in compliance with the Lake and Mendocino County Air Quality Management Districts and California Air Resource Board (CARB) air programs and the Mendocino National Forest Land and Resource Management Plan standards and guidelines.

Emissions Summary

Prescribed fires only occur with the approval of the appropriate air pollution control district, in this instance, the Lake and Mendocino County Air Quality Management Districts. Approval from the Air District is dependent on the expected emissions not causing air pollution levels to exceed the threshold where they would have an adverse effect. This regulation minimizes the potential for significant adverse effects resulting from the cumulative impact of pollutants from prescribed fires. During prescribed fires, smoke management and air quality will be closely monitored so that burning can be carried out under conditions that allow for minimizing impacts to smoke-sensitive areas and for favorable smoke dispersion.

The proposed action would have the direct effect of releasing pollutants into the air during prescribed fire operations. Prescribed fire operation would release significantly less pollutants than a potential wildfire under the no-action alternative would. Duration of smoke can be better managed through mitigation measures during a prescribed burn than a wildfire. Smoke emissions are more controllable during a prescribed fire than a wildland fire event.

If a wildfire were to occur, the potential indirect effects include degraded air quality and reduced visibility. Consumption of the increased fuel loads and understory biomass would increase the amount of smoke emissions. These emissions would also occur over a period of a few days to several weeks as opposed to intermittent days over several years for a prescribed fire project.

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